

**WHAT IS CLAIMED IS:**

1           1. A plasma display device, comprising:  
2           a plasma display panel comprising a front surface that displays images and a back surface  
3           opposite to the front surface;  
4           a chassis base attached to the back surface of the plasma display panel to support the plasma  
5           display panel, the chassis base comprising a plurality of driving circuit boards mounted on the  
6           chassis base;  
7           a front cabinet arranged adjacent to the front surface of the plasma display panel;  
8           a back cover arranged adjacent to a surface of the chassis base opposite the surface of the  
9           chassis base adjacent to the plasma display panel, the back cover being integrally assembled to the  
10          front cabinet with the chassis base and the plasma display panel arranged in between the back cover  
11          and the front cabinet; and  
12          a plurality of thermoelectric semiconductor devices arranged on the back cover, each of said  
13          plurality of thermoelectric semiconductor devices comprising a heat absorbing surface that faces the  
14          chassis base and a heat emitting surface that faces an exterior side of the back cover, the plurality  
15          of thermoelectric semiconductor devices being adapted to discharge heat generated by the plasma  
16          display panel and the plurality of driving circuit boards to the exterior side of the back cover.

1           2. The plasma display device of claim 1, wherein each of the plurality of thermoelectric  
2           semiconductor devices are electrically connected to a power supply board via thermoelectric  
3           semiconductor drivers.

1           3. The plasma display device of claim 2, further comprising:  
2           a temperature sensor adapted to detect an internal temperature of the plasma display device  
3           and adapted to output corresponding signals; and  
4           a controller adapted to receive the corresponding temperature signals from the temperature  
5           sensor, the controller being programmed and configured to control an operation of the plurality of  
6           thermoelectric semiconductor devices based on the detected internal temperature of the plasma  
7           display device.

1           4. The plasma display device of claim 1, the back cover being perforated by a plurality of  
2           openings, the plurality of thermoelectric semiconductor devices being arranged in said openings in  
3           said back cover.

1           5. The plasma display device of claim 1, wherein the plurality of thermoelectric  
2           semiconductor devices are arranged on a surface of the back cover adjacent to the chassis base such  
3           that the heat emitting surfaces of the thermoelectric semiconductor devices contact the back cover.

1           6. The plasma display device of claim 1, wherein the plurality of thermoelectric  
2           semiconductor devices are fixed to the exterior surface of the back cover such that the heat absorbing  
3           surfaces of the thermoelectric semiconductor devices contact the back cover.

1           7. The plasma display device of claim 1, further comprising a plurality of thin metal plates,  
2           each thin metal plate being attached to respective heat absorbing surfaces of each of the plurality of  
3           thermoelectric semiconductor devices, each thin metal plate having a larger surface area than the  
4           corresponding thermoelectric semiconductor devices.

1           8. The plasma display device of claim 7, wherein the thin metal plates comprise a material  
2           selected from the group consisting of aluminum and copper.

1           9. The plasma display device of claim 7, further comprising a thermal conduction member  
2           arranged between each pair of the heat absorbing surfaces of the thermoelectric semiconductor  
3           devices and their corresponding thin metal plates.

1           10. The plasma display device of claim 1, further comprising a heat sinks being arranged on  
2           corresponding heat absorbing surfaces of the thermoelectric semiconductor devices.

1           11. The plasma display device of claim 10, further comprising a thermal conduction member  
2           arranged between each heat sink and each corresponding heat absorbing surface of a corresponding  
3           thermoelectric semiconductor device.

1           12. The plasma display device of claim 1, further comprising a heat sink arranged on each  
2           heat emitting surface of a corresponding thermoelectric semiconductor device.

1           13. The plasma display device of claim 1, further comprising an insulating cover arranged  
2 over each heat emitting surface of corresponding thermoelectric semiconductor devices.

1           14. A plasma display device, comprising:  
2           a plasma display panel comprising a front surface that displays images and a back surface  
3 opposite to the front surface;  
4           a chassis base attached to the back surface of the plasma display panel and arranged to  
5 support the plasma display panel, the chassis base comprising a plurality of driving circuit boards  
6 mounted on the chassis base;  
7           a front cabinet positioned adjacent to the front surface of the plasma display panel;  
8           a back cover positioned adjacent to a surface of the chassis base opposite the surface adjacent  
9 to the plasma display panel, the back cover being integrally assembled to the front cabinet with the  
10 chassis base and the plasma display panel arranged in between; and  
11           a plurality of thermoelectric semiconductor devices mounted on the back cover, each of the  
12 plurality of thermoelectric semiconductor devices comprising a heat emitting surface that faces away  
13 from the plasma display panel and a heat absorbing surface that faces towards the plasma display  
14 panel, the plurality of thermoelectric semiconductor devices maintaining a temperature in areas  
15 around the plasma display panel and the driving circuit boards in the range of 50~60°C.

1           15. The plasma display device of claim 14, further comprising:

2 a temperature sensor adapted to detect an internal temperature of the plasma display device  
3 and outputting corresponding temperature signals; and

4 a controller arranged to receive the temperature signals from the temperature sensor, the  
5 controller being programmed and configured to control the thermoelectric semiconductor devices  
6 based on the received temperature signals.

1 16. The plasma display device of claim 15, wherein the controller is programmed and  
2 configured to:

3 compare the internal temperature of the plasma display device with a first reference  
4 temperature;

5 to drive the thermoelectric semiconductor devices when the internal temperature of the  
6 plasma display device is greater than the first reference temperature, then;

7 compare the internal temperature of the plasma display device with a second reference  
8 temperature; and

9 to discontinue operation of the thermoelectric semiconductor devices when the internal  
10 temperature of the plasma display device is less than the second reference temperature.

1 17. The plasma display device of claim 16, wherein the first reference temperature being  
2 between 55 and 65°C, and the second reference temperature being between 50 and 60°C, the second  
3 reference temperature being less than the first reference temperature.

1 18. A plasma display device, comprising: ✓

2 a plasma display panel displaying images on a front surface, the plasma display panel having  
3 a back surface opposite to the front surface; and

4 a back cover that covers and faces the back surface of the plasma display panel, the back  
5 cover being perforated by a plurality of openings, each opening comprising a thermoelectric  
6 semiconductor device arranged therein and adapted to draw heat away from the plasma display panel  
7 and through the openings in the back cover to an exterior of the plasma display device.

1 19. The plasma display device of claim 18, each thermoelectric semiconductor device  
2 comprising:

3 a p-type semiconductor material;

4 an n-type semiconductor material; and

5 metal strips, the p-type semiconductive material, the n-type semiconductor material and the  
6 metal strips each being electrically connected to each other inside an opening in said back cover.

1 20. The plasma display device of 18, further comprising a plurality of driving circuit boards  
2 arranged between said back cover and said back surface of said plasma display panel, said  
3 thermoelectric semiconductor devices also being adapted to draw heat away from the driving circuit  
4 boards and through the openings in the back cover to an exterior of the plasma display device.

1           21. The plasma display device of 19, further comprising a plurality of driving circuit boards  
2 arranged between said back cover and said back surface of said plasma display panel, said  
3 thermoelectric semiconductor devices also being adapted to draw heat away from the driving circuit  
4 boards and through the openings in the back cover to an exterior of the plasma display device.

1           22. The plasma display device of claim 21, further comprising a heat sink disposed between  
2 the back cover and the driving circuit boards.

1           23. The plasma display device of claim 22, the heat sink being in direct contact with circuit  
2 elements on said driving circuit boards.

1           24. The plasma display device of claim 22, said heat sink being separated by a predetermined  
2 distance from circuit elements on said driving circuit boards, said heat sink not being in contact with  
3 any circuit elements on said driving circuit boards.

1           25. The plasma display of claim 23, further comprising a thermal conduction member  
2 arranged between the heat sink and the back cover, the thermal conduction member being in contact  
3 with both said heat sink and the back cover and with the thermoelectric semiconductor elements in  
4 the openings in the back cover.

1           26. The plasma display of claim 25, the thermal conduction member being comprised of a

material selected from the group consisting of silicon and a thin carbon sheet.

27. A plasma display device, comprising: /

a plasma display panel comprising a front surface that displays images and a back surface opposite to the front surface;

a chassis base attached to the back surface of the plasma display panel and arranged to support the plasma display panel, the chassis base comprising a plurality of driving circuit boards mounted on the chassis base;

a front cabinet positioned adjacent to the front surface of the plasma display panel;

a back cover arranged on a side of the chassis base opposite the side of the chassis base facing the plasma display panel, the back cover being integrally assembled to the front cabinet with the chassis base and the plasma display panel arranged in between;

a plurality of thermoelectric semiconductor devices arranged between the back cover and the chassis base and adapted to draw heat away from the driving circuit boards and the plasma display panel to an outside of the plasma display panel through the back cover; and

a heat sink arranged between the plurality of thermoelectric semiconductor devices and the chassis base, the heat sink being in contact with heat dissipating circuit elements on the driving circuit boards on the chassis base, the heat sink also being in contact with the plurality of thermoelectric semiconductor devices.

28. The plasma display panel of claim 27, said plurality of thermoelectric semiconductor



2 devices being in contact with the back cover.

1 29. The plasma display panel of claim 27, the plurality of thermoelectric semiconductor  
2 devices not being in contact with the back cover and being separated from the back cover by a  
3 predetermined distance.

1 30. The plasma display panel of claim 29, the back cover being perforated by a plurality of  
2 holes, said plurality of holes being adapted for ventilation and not for accommodation of  
3 thermoelectric semiconductor devices.